

Exhibit 2

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

Blue Spike, LLC,

Plaintiff,

v.

Texas Instruments, Inc., et al.,

Defendants.

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CASE NO. 6:12-cv-499-MHS-CMC

LEAD CASE

Jury Trial Demanded

**TECHNICAL EXPERT REPORT
OF AHMED H. TEWFIK, PH.D.
REGARDING INFRINGEMENT**

A: The higher score would be a better match.

Q: How does the Audible Magic technology determine that one fingerprint is a match to another fingerprint?

A: A fingerprint is a set of numbers that represent changes in the audio at different frequencies that happen over time. And so you have a list of numbers that tell you how the audio was changing and the high frequencies and the low frequencies, that kind of thing. That's a lot of numbers. So when you have an unknown fingerprint come in, you have to compare its numbers to all the numbers in your database.

But it's basically like what I was saying with the ping pong ball analogy. That's like an XY grid, two numbers, with a bunch of numbers over here.

Well, this might be a "10-dimensional space," the mathematicians call it. You've got XYZ coordinates and you've got all these other numbers. And you can imagine that if you were to put the ping pong ball where that meets, it's way out here in some mathematical space.

And so when an unknown signature comes in, we compute—we look at where it is, and if it's really close to that one, and by "really close," I mean mathematically. It doesn't have to be exact. We don't have to see exactly the same set of numbers, but it's very close, within some numerical value. And there's no other balls that are that close.

Then we go through that process and say, "That's a match."

Maybe it's a little bit off because, uh, you know, there are a variety of things that can happen.⁹⁵

Finally, I have reviewed the Audible Magic source code subroutine, MF_Signature.h.⁹⁶ In particular, I note that the MF_Signature.h subroutine contains the following comment:

*"*Compare two signature files and write results to output file."*⁹⁷

3. **"wherein a match indicates the query signal is a version of at least one of the reference signals"**

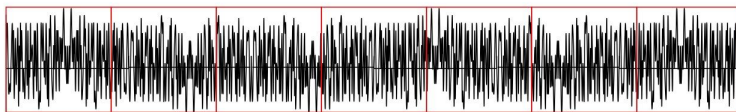
⁹⁵ Wheaton 156:20-158:12

⁹⁶ AUDMAG02626974 through 2626985.

⁹⁷ AUDMAG02626984, line 458 (emphasis added).

The Audible Magic slide below depicts a metadata tag, called AMItemID or GUID, is added to the MFCC.⁹⁸ This Metadata tag provides the mechanism through which Audible Magic's software effects the *differentiation* between versions of a song by different artists.

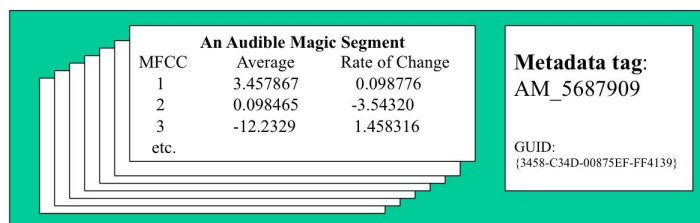
A Reference Signature is Created!



20 seconds of audio (180kb of MP3)

Becomes

20 AM Segments (1kb)



Audible Magic Confidential

Several Audible Magic documents demonstrate that a customer provides metadata, including “Teaming Up With Audible Magic: Content Registration”.⁹⁹ In particular:

Our preferred format for metadata submission is XML. Metadata that is stored in a database should be exported into XML for submission to Audible Magic.

As a content owner, you supply Audible Magic with a comprehensive list of your catalog of works; each entry in the list contains the metadata for the song, movie, or video work and the globally unique identifier that will correspond to the audio or video media work being fingerprinted. This globally unique identifier [GUID] is used to tie the fingerprint to the metadata, as described above.

This same Audible Magic document goes on to explain how the content owner's XML is incorporated into Audible Magic's own Master Database:

Using the submitted metadata in the XML data, Audible Magic extracts and adds the metadata into our existing master database of movie/video or audio content as appropriate. *Each track is automatically assigned a unique Audible Magic Item Identifier (called an AMItemID for short).* A media file that contains multiple audio tracks will result in multiple fingerprints, each with its own identifier. It is possible that you will supply some metadata that already exists in the master database; Audible Magic's

⁹⁸ AUDMAG00064317 at slide 6.

⁹⁹ AUDMAG00103772 at page 6.

When running the amSigGen tool, you specify the name of an XML file containing the metadata. In addition to creating fingerprints, the amSigGen software creates an output file called a manifest file. The manifest file lists the metadata file, signature files, and AMItemIDs, among other information. This way, Audible Magic's intake process can automatically load the metadata applicable to a given fingerprint when loading the fingerprint into Audible Magic's database.

See Appendix B for sample metadata files.^{100 101}

The deposition testimony from Audible Magic's employees is similarly supportive:

Q: Okay. And the next line, 78, **AM item ID**, can you explain to me what that is?

A: That's typically something we generate, and, again, it's often in the form of a **GUID**. So it's one of those 32 characters internally separated by some hyphens, and it's a unique identifier that we can refer to perhaps when we do a lookup or when we found a match we can say: This was the AI (sic) item ID of the unknown and this is the AM item ID of the reference that it matched.¹⁰²

An ID request is what a client application generates for — it embeds that unknown signature in something we call an ID request, which also includes a bunch of other information besides the signature itself.

. . .

We will send things like the customer code, the various GUIDs. . . . [The customer code] is typically a six-digit code, although it could also be a three-digit code that uniquely — it's one of the elements that uniquely identifies a customer.

. . .

There's a kind of standard format for GUIDs that's

¹⁰⁰ *Id.* at page 7 (emphasis added); referenced Appendix B at page 19. See also AUDMAG00106704 (XML Data Dictionary).

¹⁰¹ See also AUDMAG00103772 at page 31. ("Note the Audible Magic unique identifier in the returned XML. . . additional information onto your OwnerItemID, and we call that the AMItemID. Specifically, we have added a reference to the audio stream number (this will always be _a00 for submitted content submissions) and your SupplierID (in this example, _XXX, but yours will be different). Thus, on a related note, when issuing identification (ID) requests against your submitted content database, you will only get the AMItemID returned in the response XML. To map the AMItemID back to your original OwnerItemID, you will need to strip off this additional data.")

¹⁰² Blum 177:25-178:11 (emphasis added).

used across the whole PageID#r20334 think it's like 32 characters or something like that. And they come in groups of characters, separated by dashes.¹⁰³

Q So the software around recognizing the unique identifier isn't related to the fingerprint generation or fingerprint recognition?

A Not directly. The only reason we would know a unique identifier means that that set of data is, let's say, Santana's album, is because at one point in time, we saw all the audio, we analyzed it, fingerprinted it, and said, "Yes. That's Santana's album." Therefore, every time we see that unique identifier, we're very confident that that's what it is without having to re-fingerprint it and reanalyze it.

That these GUIDs or Metadata tags provide Audible Magic with the ability to effect the differentiation between versions of songs is evidenced in a Sony database that Audible Magic produced. Following is a screen shot of a small portion of the Sony database:

¹⁰³ Blum 174:19-175:22

¹⁰⁴ Wheaton 91: 4 – 14.

PageID # 30335

AUDMAG00364206 - Confidential - Outside Counsel Only.xlsx

Home Layout Tables Charts SmartArt Formulas Data Review

Font: Calibri (Body) 11, Bold, Italic, Underline, Text Color, Background Color, Conditional Formatting

Alignment: Wrap Text, Merge

Number: Text, Percentage, Decimals, Rounding

Format: Normal, Bad, Neutral, Calculation

A	B	C	D	E	F	G
Song	Artist	ISRC	AM Item ID	Supplier	Date	
1 I Know You Want Me (Calle Ocho)	Pitbull	USUS10900237	00000000000022166003TRE	Sony	2010-05-22 00:23:11.000	
2 Breathe	Blu Cantrell Featuring Sean Paul	USAR10201522	00000000000010055139TRE	Sony	2010-05-22 00:08:33.000	
3 Evacuate The Dancefloor	Cascada	DEHK90911201	00000000000022216360TRE	Sony	2010-05-22 00:27:15.000	
4 When You're Gone	Avril Lavigne	USRC10700004	00000000000012812293TRE	Sony	2010-05-22 00:49:13.000	
5 When You're Gone	Avril Lavigne	USRC10700004	00000000000012863559TRE	Sony	2010-05-22 00:49:13.000	
6 Evacuate The Dance Floor	Cascada	DEHK90911320	00000000000021912405TRE	Sony	2010-05-22 00:27:27.000	
7 Poker Face	Lady Gaga	USUM70824409	00000000000021651487TRE	Sony	2010-05-22 02:14:16.000	
8 Poker Face	Lady Gaga	USUM70824409	00000000000021666349TRE	Sony	2010-05-22 02:14:16.000	
9 On The Radio	Various	USPR38008037	00000000000010053504TRE	Sony	2010-05-22 02:49:05.000	
10 Second Nature	Destiny's Child	USSM19702005	0000000000001929499TRE	Sony	2010-05-22 04:49:24.000	
11 Maware Maware	MISIA feat. M2J + Francis Jocky	JPBV1020651	00000000000022310547TRE	Sony	2010-05-22 05:57:01.000	
12 The Final Countdown	Various	USSM19300071	00000000000012543449TRE	Sony	2010-05-22 06:07:07.000	
13 The Final Countdown	Europe	USSM18600196	00000000000012296344TRE	Sony	2010-05-22 06:07:07.000	
14 The Final Countdown	Europe	USSM18600196	00000000000010158368TRE	Sony	2010-05-22 06:07:07.000	
15 The Final Countdown	Europe	USSM18600196	00000000000007543344TRE	Sony	2010-05-22 06:07:07.000	
16 The Final Countdown	Europe	USSM18600196	00000000000009142912TRE	Sony	2010-05-22 06:07:07.000	
17 The Final Countdown	Europe	USSM19300071	00000000000009142886TRE	Sony	2010-05-22 06:07:07.000	
18 The Final Countdown	Europe	USIR10311874	00000000000011903729TRE	Sony	2010-05-22 05:52:19.000	
19 My Love Is Like...Wo	Various	USPG16590023	000000000000002473033TRE	Sony	2010-05-22 07:39:31.000	
20 Unchained Melody	The Righteous Brothers	FRZ819901596	00000000000003497782TRE	Sony	2010-05-22 07:39:31.000	
21 Unchained Melody	Various	USPG16590023	00000000000020666699TRE	Sony	2010-05-22 07:39:31.000	
22 Unchained Melody	The Righteous Brothers	FRZ819901596	000000000000002844150TRE	Sony	2010-05-22 07:39:31.000	
23 Unchained Melody	Various	FRZ058900110	00000000000012546105TRE	Sony	2010-05-22 09:18:49.000	
24 Place Des Grands Hommes	Patrick Bruel	USSM10400178	00000000000002789592TRE	Sony	2010-05-22 09:46:08.000	
25 No Giving Up	Crossfade	GBCE0901525	00000000000022301329TRE	Sony	2010-05-22 10:41:48.000	
26 Won't Go Quietly	Example	USPM19301002	00000000000003100952TRE	Sony	2010-05-22 10:23:10.000	
27 Before I Go	Yanni	USSM10015268	00000000000000028793TRE	Sony	2010-05-22 10:38:43.000	
28 Pigs (Explicit)	Cypress Hill	USSM19907167	00000000000000007171TRE	Sony	2010-05-22 10:38:43.000	
29 Puerco (Pigs)	Cypress Hill	USSM19901631	00000000000000227200TRE	Sony	2010-05-22 10:38:43.000	
30 Pigs	Cypress Hill	USSM19901631	000000000000002354194TRE	Sony	2010-05-22 10:38:43.000	
31 Pigs	Cypress Hill	USSM19901505	000000000000000045034TRE	Sony	2010-05-22 11:17:44.000	
32 Wild Wild West	Will Smith Featuring Dru Hill & Kool Mo Dee	USSM19901509	00000000000002001887TRE	Sony	2010-05-22 11:17:44.000	
33 Wild Wild West	Will Smith Featuring Dru Hill & Kool Mo Dee	USSM19901505	00000000000001938899TRE	Sony	2010-05-22 11:17:44.000	
34 Wild Wild West	Will Smith Featuring Dru Hill & Kool Mo Dee	USPM19301002	00000000000016488517TRE	Sony	2010-05-22 10:22:58.000	
35 Before I Go	Yanni	USPM19301002	00000000000016628485TRE	Sony	2010-05-22 10:22:58.000	
36 Before I Go	Yanni	FRZ080901293	00000000000021880917TRE	Sony	2010-05-22 12:08:08.000	
37 Non non non (Ecouter Barbara)	Camélia Jordana	USSM19901505	0000000000002699576TRE	Sony	2010-05-22 11:17:36.000	
38 Wild Wild West	Will Smith Featuring Dru Hill & Kool Mo Dee	USWB10705209	00000000000021830255TRE	Sony	2010-05-22 12:36:07.000	
39 Untouched	The Veronicas	USRC10900433	00000000000022203198TRE	Sony	2010-05-22 14:23:53.000	
40 TiK ToK	Ke\$ha	USRC10900433	00000000000022157141TRE	Sony	2010-05-22 14:23:53.000	
41 TiK ToK	Ke\$ha	USRC10900433	00000000000022157141TRE	Sony	2010-05-22 14:23:53.000	
42 Siffler Sur La Colline	Joe Dassin	FRZ086900080	00000000000009993769TRE	Sony	2010-05-22 14:09:52.000	
43 Sweetest Thing	Original Soundtrack	USIR29900016	0000000000002697559TRE	Sony	2010-05-22 14:39:57.000	
44 When You're Gone	Avril Lavigne	USRC10700004	00000000000012812293TRE	Sony	2010-05-22 14:42:15.000	
45 When You're Gone	Avril Lavigne	USRC10700004	00000000000012863559TRE	Sony	2010-05-22 14:42:15.000	
46 Cold As Ice	Starsplash	DEN060790000	00000000000012513760TRE	Sony	2010-05-22 14:50:39.000	


In lines 13 -18 of this Sony spreadsheet, the song “The Final Countdown” is listed six times with five entries reflecting “Europe” as the artist with the sixth entry reflecting “Various” as the artist (in the second column).¹⁰⁵ Similarly, in this same spreadsheet at lines 20 – 23, the song “Unchained Melody” reflects “The Righteous Brothers” as the artist as well as two entries for “Various” as the artist. Because each of these entries is assigned a unique AM item ID (column four), the Audible Magic software is capable of differentiating between the same song performed by different artists, *i.e.*, versions of the same song.

Not only is the Audible Magic software capable of *differentiating* versions, it does differentiate. As evidenced in the following screenshot from Audible Magic’s website, different versions of “I Am A Man Of Constant Sorrow” sung by different artists is provided at Tracks 5 and 7:

¹⁰⁵ AUDMAG00364206 (excerpt). I reserve the right to provide additional screen shots of other song examples at trial from this Audible-Magic produced spreadsheet.

The RepliCheck™ Software Generates Detailed Anti-Piracy Reports

When the process is complete, users can generate a Media Anti-Piracy Report verifying detailed content information for each copyrighted track on a CD.

 Media Anti-Piracy Report					
Customer: _____		Run Date: 18-Jun-2002 05:26 PM			
Acct No: _____		Technician: _____			
Job No: _____					
Source Folder/CD: D:\					
Entry Count: 19					
File/Track	Status	Title / Artist	Releasing Label	Copyright Date	
Track01 .cda	Found	Po Lazarus James Carter & The Prisoners	Mercury	2000	
Track02 .cda	Found	Big Rock Candy Mountain Harry McIntock	Mercury Nashville	2000	
Track03 .cda	Found	You Are My Sunshine Norman Blake	Mercury	2000	
Track04 .cda	Found	Down In The River To Pray Alison Krauss	Mercury Nashville	2000	
Track05 .cda	Found	I Am A Man Of Constant Sorrow The Soggy Bottom Boys	Mercury	2000	
Track06 .cda	Found	Hard Time Killing Floor Blues Chris Thomas King	Mercury Nashville	2000	
Track07 .cda	Found	I Am A Man Of Constant Sorrow Norman Blake	Mercury	2000	

Additionally, the Audible Magic source code subroutine MF.signature.c line reflects aMItemID as a value in the signature/abstract.¹⁰⁶

¹⁰⁶ AUDMAG02626988, AUDMAG02626529 through AUDMAG026226530.